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ENTOMOLOGICAL NEWS

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CONTENTS

La Rivers—Dragonfly observations in Nevada 209

Obituary 217

Ries—Uroceras gigas in Brazil 218

Personal 218

Pate—Generic names of the Sapygidae 219

Lasky—Mosquitoes at Denver, Colorado (cont.) 222

Shappirio—Notes on wasps 229

Entomological Literature 230

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ENTOMOLOGICAL NEWS

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Some Dragonfly Observations in Alkaline Areas in Nevada

By IRA LA RIVERS, Nevada Academy of Natural Sciences, Reno, Nevada

Ophiogomphus morrisoni Selys 1879

This Pacific coast species enters the western Great Basin along streamways which head in the Sierra Nevada mountains and end in desert basins in Nevada. In 1914, Kennedy (1917) found it prominent on the Truckee River system from Lake Tahoe (6225 feet elevation) down to the valleys and alkali plains of central western Nevada at elevations as low as 3800 feet. The difference in elevation does not seem marked, at first glance, but climatic conditions are radically altered from the one situation to the other. Lake Tahoe lies in the High Sierras surrounded by dense coniferous forests. As zonations go, this vicinity can be accredited to the Transition, and possesses an average rainfall of 20 inches. On the flats of adjacent central Nevada, Upper Sonoran elements constitute the zonational picture and over most of this vast region, *Atriplex* and *Sarcobatus* (shadscale and greasewood) replace the sagebrush (*Artemisia tridentata*) so popularly and erroneously thought to characterize most of the Upper Sonoran zone in Nevada. Annual rainfall decreases to less than 4 inches in portions of this region within the immediate range of *O. morrisoni*.

This diversification of the floral picture is somewhat misleading, however, in any consideration of dragonfly ecology, for aquatic insects do not generally reflect such extreme changes in external temperatures since water is more stable in this respect than ground or air, and humidity is no longer a factor. So while certain dragonflies may be definitely restricted to high cold

mountain streams, and others to the warmer waters of lowlands, many occur indiscriminately in the two areas, generally requiring only certain types of stream bottoms on which to pass the naiadal stage.

This is the case with *O. morrisoni;* not only does it occupy both types of habitats, but occurs in waters varying widely in percentage of total solids, from fresh to brackish. The Truckee River in its upper reaches is one of the purest of mountain streams—in its extreme lower stretches where it meanders through alkaline desert ground, it becomes increasingly brackish. Pyramid Lake, a tectonic basin of considerable proportions into which the Truckee River naturally empties, is quite brackish.

Only one requirement seems consistently needed for the species—that of a gravelly or sandy bottom for the naiad stage. Kennedy (1917) records it frequenting gravel bars and beaches from the High Sierras to the Humboldt River system east of Pyramid Lake. In the vicinity of Pyramid Lake, I have found it more commonly, and in many cases, exclusively, on sand beaches and bars, but there can be little intrinsic difference here between the two habitats, intergrading as they do.

The subspecies *O. morrisoni nevadensis* Kennedy 1917 was based on specimens from the western Great Basin, typical *morrisoni* being delimited to higher montane areas to the adjacent west. There is little actual difference between the two varieties, but *nevadensis* seems good on the basis of ecological considerations. The exact inter-relationships of the group of *Ophiogomphi* containing the species *occidentis, severus* and *morrisoni* have yet to be worked out. Very probably intergrading forms will be found, when material from the concerned Western areas can be compared. All are somewhat unstable, exhibiting considerable individual variation, both in coloration and genitalia.

O. morrisoni has been recorded from both the Truckee and Humboldt River systems in Nevada (Kennedy 1917, La Rivers 1940, 1941), where it is quite common. Dr. Kennedy's Pyramid Lake specimens were taken in August of 1914 and, from his notes (1917), seem to have come from the Truckee River a few miles from its delta at the southeast edge of the lake. Under

the description of *O. m. nevadensis,* he lists the allotype from "Pyramid Lake, Nevada," but in a list of captures at Pyramid Lake, no *O. m. nevadensis* is mentioned. In any event, his collecting locality at the Lake seems to have been in the neighborhood of a mile east of the river mouth. Here the lake waters are comparatively fresh as against the salinity concentrations achieved farther north.

For many years I have known of an almost phenomenal abundance of the species in the brackish middle waters of the lake as evidenced by the cast skins of emergent naiads left conspicuously on lime-whitened tufa domes just above water level in the vicinity of the Pyramid, a massive rock-island close to the eastern shores of the lake. However, I was never able to collect the spot at optimum emergence time, and naiads never seemed abundant. During June 19–20, 1946, the species was found emerging in large numbers about rocks surrounded by sandy shore in the vicinity of the Pyramid, and was the only immature form to be taken from the water, although adult *Sympetrum corruptum* were regular inhabitants. While most emergences apparently took place during the night or early morning hours, many naiads crawled up on the rough tufa on shaded sides, or hid under slabs of tufa and went through the process of emergence during all hours of the day. Cast skins were everywhere, but imagines were only rarely seen, a fact attesting the nervous activity and wide-ranging propensity of adults.

The process of emergence occupied only some 30 minutes, at the end of which the very pale tenerals had expanded their wings sufficiently to flutter to a more protected spot on the rocks. Specimens hardened in paper sacks required some 24 hours to attain a good color, and were not then entirely hardened. Air temperature at 3 P.M. was 90°F, and lake water along the shallow, sanded beach varied from 64°F to 73°F, depending on whether it lay in the shade or exposed to the hot desert sun. Naiads came up in about equal numbers from both shaded and unshaded water. Water temperatures were obtained from six inches of depth—temperatures dropped sharply in several feet of water some distance from the shore.

The ability of *O. morrisoni* to tolerate wide variations in brackishness can be demonstrated by the fact that Pyramid Lake has undergone marked changes in volume in the 100 years since its discovery by the white man, and is now at the lowest and most brackish level in its recorded history. When discovered by Fremont in the winter of 1844, the lake has been reliably estimated to have stood at an elevation of 3860 feet (Hardman and Venstrom 1941), which was considered low under normal conditions. It rose to a maximum of 3879 feet in 1868, remained above 3860 feet until 1917, since which time it has steadily dropped until it stood at 3818 feet in 1939. At the present writing (1946) it stands at 3814 feet (Dukes 1946) and seems to have established a quasi-equilibrium with the greatly curtailed Truckee River inflow. It will doubtless retreat farther in the ensuing years, but the period of accelerated recession such as occurred between 1917 and 1939 when the lake level dropped nearly 50 feet in 22 years seems to be over. From 1939 to 1946, the level receded at an average rate of 7 inches per year as compared with 27 inches per year during the 1917–1939 interval.

Tree-ring studies of the Truckee River system watershed (Hardman and Reil 1936) indicated that drought conditions prevailed in the area for many years prior to 1860, at which time increased precipitation raised the lake level considerably. This continued until about 1917, when drought again became dominant; this, coupled with the tapping of the lower Truckee River by the Fallon agricultural district's Derby Canal in 1908, was sufficient to initiate extreme desiccation of the Pyramid Lake area. During Dr. Kennedy's collecting visit to the south end of Pyramid Lake, the water level stood between 3865 and 3861 feet, some 50 feet higher than it is today, although he erroneously listed it at 3880 feet. Its companion lake, Winnemucca, then with approximately 70 feet of water in its deepest portions, is now (1946) absolutely dry, and has been so for nearly ten years, being now a large alkaline flat or playa, containing water only during the winter and spring rains.

During Jones' (1925) 1914 analyses of Pyramid Lake at a level of about 3863 feet, the water showed a content of approximately 0.270% NaCl, or about one-tenth that of seawater. Hutchinson's (1937) 1933 investigations gave him a figure approxi-

mating 0.320% for an elevation of about 3826 feet, or something like an eighth that of seawater. Analyses by Miller (1946) for 1943 indicate a salinity of approximately 0.334% at a lake level of 3815.5 feet. His analyses for 1944 were quite similar, showing a salinity remaining at approximately that of the 1943 level. During the summer of 1946, I took a water sample at Fremont Point, on the mid-eastern shore of Pyramid Lake at the focus of *Ophiogomphus morrisoni* emergence previously mentioned, which Mr. Miller was kind enough to run. The sample was obtained in about a foot of constantly-moving water along the sandy beach, care being taken to eliminate the obvious, macroscopic sediments in suspension. The resulting analysis showed a total salinity of 0.350%; lake elevation was 3814 feet. The increase over the 1943 figure is possibly attributable to the proximity of the shoreline, which is demonstrably contributing material to the lake with each rain, and also to the leaching action of the waves.

It is thus apparent that concentration of electrolytes is proceeding systematically in the lowering lake, and it is quite obvious that a point will be reached eventually at which such concentration will progressively eliminate much of the animal life now occupying the basin, leaving only a few halobiotes. Hutchinson (1937) mentions the finding of "a very large number of dead dry fish" on a low terrace in Winnemucca Lake, shallow companion of Pyramid Lake, "three meters above the water level" (of 1933), which were determined as *Leucidius pectinifer* Snyder 1917, a lake chub now (1946) swarming in Pyramid Lake, and once as common in Winnemucca Lake. A strict lake breeder, this species was perhaps the last to go, although no specific data are available for several other species once common to the lake. These were presumably killed by electrolytic concentration which had reached a lethal point, and probably died during 1930, when the lake stood approximately three meters above the level of 1933. The NaCl concentration during Hutchinson's investigations of Winnemucca Lake stood at approximately 5.0% and a slightly lower value undoubtedly prevailed when the lake was ten feet higher. However, in such speculations, there are other electrolytes than sodium and chlorine to be considered; calcium, magnesium, potassium, phosphorus, sul-

fates, carbonates and bicarbonates are all present, are all concentrating at the present time, and must all be accorded a part in the picture—how much of a part is not apparent at present. Some idea of their prevalence may be gained by comparing total solids in Pyramid Lake with total salt content. For example, total solids during Jones' analyses amounted to approximately 0.35% for the lake as against 0.27% of salt; the 0.08% representing ions other than sodium and chlorine. Miller's 1943 analyses give total solids approximating 0.47%, an increase of 0.12% over Jones' figures. No such data are available on lethal concentrations for insects, which flourished in Winnemucca as they do in Pyramid today, but it is certain the latter will have to recede tremendously from what it is today before such concentrations become effective. Pyramid Lake now has slightly more than 300 feet of water in its deepest portions, although small decreases in water level will leave large areas at the shallow north and south ends exposed. If and when the lake becomes too saline to support non-halophiles, such species will undoubtedly move to the freshwater sloughs about the mouth of the river and to the river itself.

Dr. Kennedy gives a specific gravity of 1.0034 for Pyramid Lake in 1914. My data indicate a slightly smaller figure. By 1943, when the lake level had receded nearly 48 feet from its 1914 elevation, the specific gravity stood at a fraction in excess of 1.004. It would seem, from Osborn's data (1906), that a critical point may be approaching for odonates, but at present, a large population of several species flourishes in the lake, as well as other non-halophiles upon which the naiads prey, and at the slowly accumulative rate of salinity concentration now prevailing, it would seem that no sudden extinction awaits the naiadal population, but rather a gradual lessening of its numbers.

The damselfly *Enallagma clausum* Morse 1895 was quite abundant about the sanded shore margins of the lake in the vicinity of the Pyramid, but naiads were only rarely found, and these where many tufa fragments lay in the water and provided cover. Adults, however, were common perching on dried tumbleweed or Russian thistle (*Salsola kali tenuifolia*) lying partially imbedded along the shore.

Spring, South Smoke Creek Desert

While field collecting during June of 1946, I found a local focus of dragonflies at the south end of the Smoke Creek desert, 55 miles due north of Reno, Nevada (Washoe County), and some 70 miles by road. This desert, a massive alkali flat 35 miles long and 8 miles wide, is the southernmost of a chain of such sinks stretching from the north end of Pyramid Lake for over a hundred miles northeasterly across northwestern Nevada, and all are remnants of Pleistocene Lake Lahontan. Water is excessively scarce in these waste areas and we came without warning upon the highly mineralized springs in the *Sarcobatetum vermiculati* (Billings 1945) about a mile south of the south end of the Smoke Creek desert. Such areas as this are of interest to the odonatist in the Great Basin since the dragonfly population is generally discontinuous and concentrated about such spots. The many miles intervening are devoid of all but a few wanderers.

South of the springs sanded hills rose to a moderately-sized ridge—between the springs and the desert the soil became decreasingly sandy and increasingly alkaline. Greasewood (*Sarcobatus vermiculatus*) prevailed and grew large and sturdy. No trees grew about the springs, but some 300 yards of shallow, narrow ponds lay on the alkali hardpan, fed by two springs, and bearing extensive growths of sedges and grasses. Over these pools dragonflies of many species swarmed. Some swept persistently over the water, others were found only among the greasewood about the ponds. Seining produced very few naiads, chiefly those of *Plathemis lydia subornata*, which was by far the commonest species over the pond.

The following species were taken: (21/VII/46, el. 4000 ft., LaR. & Christensen).

Anax junius (Drury) 1773. Occasional individuals beat over the pools on wider circuits which carried them some distances out in the *Sarcobatetum*. Uncommon.

Aeshna multicolor Hagen 1861. These were common, and, while met occasionally beating over the surrounding greasewood, were most in evidence working carefully through the mediumly-dense thickets of sedges at an average height midway between the water and the tops of the plants—they were quite adept and persistent in this type of hunting, and seemed more stealthy than usual. They invariably pursued any *Anax junius* which appeared.

Libellula saturata Uhler 1857. Only one individual was seen over the greasewood some distance from the ponds.

Libellula pulchella Drury 1773. Somewhat less common than *Aeshna multicolor,* and, like it, found over pond and greasewood.

Libellula composita Hagen 1873. Only a few individuals of this white-faced, distinctly blue-bodied species were seen. All were found in the *Sarcobatetum* about the ponds, and were difficult to catch in the brisk breeze then prevailing.

Plathemis lydia subornata Hagen 1861. This form, only weakly differentiated from typical *lydia,* was by far the commonest dragonfly, and was seemingly restricted to the pond areas, where it beat over the water in regular circuits, *Libellula saturata*-fashion. The only female seen was perpetually molested by the numerous males as she sought to oviposit in marginal waters (June 21). With *Erythemis simplicicollis* and *Sympetrum corruptum,* this is generally the only species found in the smaller springs of this area of the desert, springs which are often only muddy seeps, generally near the base of a hill, and few and far between.

Sympetrum corruptum Hagen 1861. This was not common, only a few individuals being seen, with males and females about equally represented.

Pachydiplax longipennis Burmeister 1839. One specimen was taken in the brush some distance from water.

Erythemis simplicicollis Say 1839. Several individuals were seen, and one taken, both in the *Sarcobatetum* and about the pond margins.

Strangely enough, no *Pantala* or *Trapezostigma* were seen.

Lestes congener Hagen 1861. This large damselfly was not common about the ponds, but was usually found resting in the greasewood about the water, wings half-spread in characteristic fashion.

Ischnura denticollis Burmeister 1839. Common, and one of the smallest species present; confined apparently to the pond margins.

Ischnura cervula Selys 1876. One specimen was taken at the pond margin.

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Obituary

Morgan Hebard, one of our leading students of the Orthoptera and Dermaptera, died suddenly on December 28, 1946, at his home in suburban Philadelphia. A biographical sketch of his life will appear in an early number of ENTOMOLOGICAL NEWS.

Urocerus gigas Fabricius in Brazil (Hym.: Siricidae)

By Donald T. Ries, Illinois State Normal University, Normal, Illinois

Several years ago while checking some sawflies in the collection of the Academy of Natural Sciences in Philadelphia, I found seven specimens of Siricidae which, according to the labels, were collected at "Itunana River, Matto Crosse, Brazil, 1880." This is without doubt Matta Grosso, the large dense forest province of inland Brazil. No previous record of the occurrence of Siricidae in South America has been found in literature.

I identified the specimens (all females) as *Urocerus gigas* Fabricius, a common palearctic species. This identification was corroborated by Mr. Robert B. Benson of the British Museum (Natural History) who kindly compared one of the specimens with material in that institution.

Although it is common through Europe and Asia, no records of this species have heretofore been reported from the western hemisphere. The most logical explanation for its occurrence in South America is that lumber containing the larval stages was shipped in from some European country.

A similar instance of the importation of nearctic species of Siricidae to England in lumber has been recently recorded by Benson (Ent. Monthly Mag., lxxxi, 67–68, 1945).

Personal

Dr. H. Radclyffe Roberts, Assistant Curator in the Department of Insects, member of the Board of Trustees and of the Scientific Council of the Academy of Natural Sciences, has been appointed Managing Director of that Academy as of January 1, 1947. Dr. Roberts is known among entomologists for his original work on Orthoptera and as joint author of the two parts of the "Mosquito Atlas."

The Generic Names of the Sapygidae and their Type Species (Hymenoptera: Aculeata)

By V. S. L. Pate, Ithaca, N. Y.

The Sapygidae are a small family of approximately eighty described species, distributed among nine genera. Representatives of the family occur in all the major zoogeographic regions of the world with the exception of the Australian Realm.

In the past, the Sapygidae have been regarded as a wholly parasitic group and their exact taxonomic position has long been a matter of conjecture. But *Fedtschenkia,* hitherto generally considered to be a somewhat aberrant Mutillid, is indubitably a Sapygid and is the type of a separate and distinct subfamily. The structure of the legs indicates that the members of this Holarctic genus are without question fossorial forms. Indeed, the general habitus of *Fedtschenkia* is so very similar to that of the present day Anthoboscines, there can be little question that the Sapygidae arose from the ancestral stock of those forms.

A list of the generic and subgeneric names proposed for Sapygidae, with the type species of each, is presented below. The form of citation used is the same as that introduced in my catalogues [1] of the generic names of the Sphecoid wasps and of the Psammocharidae.

Aclastocera Förster, 1855. Verh. naturhist. Ver. preuss. Rheinl. u. Westphal., XII, p. 247.

Type: *Aclastocera Frivaldskii* Förster, 1855 [= *Polochrum repandum* Spinola, 1805]. (Monobasic.)

Isogenotypic with *Polochrum* Spinola, 1805, *q.v.*

Araucania [2] new genus for *Laura* Reed, 1930 *nec* Trinchese, 1873 [3] *nec* Lacaze-Duthiers, 1883.[4]

Type: *Laura chilensis* Reed, 1930 [= *Araucania chilensis* (Reed)].

Isogenotypic with *Laura* Reed, 1930, *q.v.*

[1] *Sphecidae:* Mem. Amer. Ent. Soc. no. 9, (1937). *Psammocharidae:* Trans. Amer. Ent. Soc., LXXII, pp. 65–137, (1946).

[2] After the Araucanian Indians of Chile.

[3] Trinchese, 1873, Mem. Accad. Sci. Ist. Bologna, (3), IV, p. 198.

[4] Lacaze-Duthiers, 1883, Mém. Acad. France, (2), XLII, no. 2, p. 1.

Arthrosapyga Pic, 1920. L'Echange, Revue Linnéenne (Moulins), [XXXVI], no. 400, p. 15; (Aug. 2, 1920). [Several species.]

TYPE: *Sapyga* (*Arthrosapyga*) *sancta* Pic, 1920. (Original designation.)

Cosilella Banks, 1913. Bull. Amer. Mus. Nat. Hist., XXXII, p. 237; (July 9, 1913).

TYPE: *Cosila* (*Cosilella*) *plutonis* Banks, 1913[5] [= *Telephoromyia anthracina* Ashmead, 1898 = *Fedtschenkia anthracina* (Ashmead)]. (By original designation and monobasic.)

Eusapyga Cresson, 1880. Proc. Ent. Sect. Acad. Nat. Sci. Phila., 1880, p. xx *in* Trans. Amer. Ent. Soc., VIII, (Dec. 1880). [Five species.]

TYPE: *Sapyga* (*Eusapyga*) *rubripes* Cresson, 1880 [= *Eusapyga rubripes* (Cresson)]. (By designation of Ashmead, Jan. 5, 1903, Canad. Entom., XXXV, p. 3.)

Fedtschenkia de Saussure, 1880.[6] [*in* Fedtschenko], Reise in Turkestan, II, Zool. Th., 13 Hymenoptera: Scoliidae, p. 13. [Bull. Imp. Gesell. Fr. Nat. Hist., Anthropol., Ethnograph., XXVI, p. 10.]

TYPE: *Fedtschenkia grossa* de Saussure, 1880. (Monobasic.)

Hellus Fabricius, 1805. Systema Piezatorum, p. xiii [genus only]; p. 246. [Seven species.]

TYPE: *Hellus 6-punctatus* Fabricius, 1805[7] [= *Scolia 5-punctata* Fabricius, 1781 = *Sapyga 5-punctata* (Fabricius)]. (Fixed by Shuckard, 1837, Essay Indig. Fossor. Hymen., p. 44.)
Isogenotypic with *Sapyga* Latreille, 1796, *q.v.*

Laura E. P. Reed, 1930 *nec* Trinchese, 1873 *nec* Lacaze-Duthiers, 1883. Rev. Chileña Hist. Nat., XXXIII, p. 508.

[5] After examining the type of *Cosila* (*Cosilella*) *plutonis* Banks, a female in the collection of the American Museum of Natural History, I am convinced that it is merely the opposite sex of the species which Ashmead described fifteen years earlier as *Telephoromyia anthracina*.

[6] The western North American species *anthracina*, which Ashmead in 1898 described and assigned to the Thynnid genus *Telephoromyia*, is referable to the genus *Fedtschenkia*.

[7] Fabricius indicated he considered, but did not designate, this species as type.

TYPE: *Laura chilensis* E. P. Reed, 1930 [= *Sapyga chilensis* (Reed) [8] = *Araucania chilensis* (Reed)]. (Monobasic.)
Isogenotypic with *Araucania* new genus, *q.v.*

Monosapyga Pic, 1920. L'Echange, Revue Linnéenne, (Moulins), [XXXVI], no. 400, p. 15; (Aug. 2, 1920).

TYPE: *Sapyga* (*Monosapyga*) *Theresae* Pic, 1920. (Original designation and monobasic.)

Parasapyga Turner, 1910. Trans. Ent. Soc. London, 1910, p. 405.

TYPE: *Parasapyga mölleri* Turner, 1910. (Monobasic.)

Polochridium Gussakovskij, 1933. Ark. Zool. (Stockholm), 24 A, no. 10, p. 48.

TYPE: *Polochridium eoum* Gussakovskij, 1933. (Original designation and monobasic.)

Polochrum Spinola, 1805. Fauna Liguriae Fragmenta, p. 7, (1805); Insectorum Liguriae . . . I, p. 19, (1806).

TYPE: *Polochrum repandum* Spinola, 1805.[9] (Monobasic.)
Isogenotypic through synonymy with *Aclastocera* Förster, 1855, *q.v.*

Sapyga Latreille, 1796. Précis Caract. Insect., p. 134, (1796); [no species]. Hist. Nat. Crust. Insect., III, p. 346, (1802); [one species].

TYPE: *Scolia 5-punctata* Fabricius, 1781 [= *Sapyga 5-punctata* (Fabricius)]. (Fixed by Latreille, 1802, *v. sup.*)
Isogenotypic through synonymy with *Hellus* Fabricius, 1805, *q.v.*

Sapygina A. Costa, 1887. Prospetto degli Imenotteri Italiani . . . II, p. 111.

TYPE: *Sapyga 10-guttata* Jurine, 1807 [= *Sapygina 10-guttata* (Jurine) [9]]. (Monobasic.)

[8] Reed originally described *Laura* as a Masarid wasp, but later (1932, Rev. Chileña Hist. Nat., XXXVI, pp. 141–143), at the suggestion of Bequaert, sank it as a synonym of *Sapyga*. However, as will be shown elsewhere, I consider the group generically distinct, and hence have proposed the new name *Araucania* for it.

[9] Arnold (1929, Ann. Transvaal Mus., XIII, p. 175) considers both *Polochrum* and *Sapygina* to be merely subgenera of *Sapyga*, but I believe each is sufficiently distinct to be accorded generic rank.

Report of Mosquitoes Collected at Fitzsimons General Hospital, Denver, Colorado, During the Seasons of 1944–1945

By William R. Lasky, Sgt., U. S. Army, Fitzsimons General Hospital, Denver, Colorado

(*Continued from page 193*)

Aedes trivittatus Coquillett

Aedes trivittatus was collected and found breeding throughout the two seasons in moderate to small numbers. As little is known about its breeding habits, some investigations were made that yielded good results. It was found to develop so fast under natural conditions that the few pupae found in a collection of half-grown *Aedes dorsalis* larvae were usually *A. trivittatus* pupae. If first instar larvae of *A. dorsalis* were collected, the two or three half- to full-grown intermingled larvae would be *A. trivittatus*. Therefore, unless frequent collections are made, it is very easy to miss. Good luck was had with rearing this species in the laboratory. Wild adult females were collected gorging and were found to oviposit readily on damp cotton. Three days elapsed between the last meal and oviposition. It was noted that all females so bred died following oviposition. To simulate natural conditions one batch of eggs was allowed to dry out slowly for 11 days, at the end of which time distilled water was added to the cotton and within 24 hours the first larvae had emerged. Five days were required for these larvae to pupate and adults emerged 24 hours following pupation. These larvae were fed on a suspension of cultured brewers yeast, *Saccharomyces*. Another female oviposited and her eggs were allowed to dry out. These eggs were slowly dried for 22 days, at the end of which time distilled water was added. These eggs did not hatch for nine days following moistening. These larvae pupated in eight days and emerged on the ninth. A third set of eggs collected in the same manner and slowly dried out for 21 days did not emerge until 29 days later. These larvae died after the first instar so

further data could not be collected. From these data, it may be concluded that factors other than moisture influence the emergence of this larvae from the egg.

This mosquito was collected in moderate numbers by trap and a small number of individuals were collected biting in full daylight both on sunny and on dark days.

Larvae were first collected in the alkaline, grassy rain-water depressions in the meadows northwest of the post. Here four larvae of this species were collected July 13th, 1944, with *Aedes vexans* and *Aedes dorsalis*. Some were collected in this same area June 7th, 1945, and August 13th, 1945, with *Aedes dorsalis, Aedes nigromaculis* and *Aedes vexans*. A couple of larvae were also found in a similar rain-water, prairie pool at another location on June 7th, among large numbers of *Aedes dorsalis* and *Aedes vexans*. A few were taken from an irrigation ditch catch-basin west of Fitzsimons June 7th, 1945, and July 26th, 1945 together with *Culex tarsalis, Culiseta inornata, Aedes vexans* and *Psorophora signipennis*. This area is not a permanent one as it frequently becomes dry between irrigation periods. Lastly, larvae were collected in small numbers in a rain-water pool under some large cottonwoods located in the fields north of Fitzsimons, an area which periodically fills with rain water, then dries. The dates were June 12th, June 18th, June 26th, August 8th and August 13th, all in 1945. In the same pool were *Culiseta inornata, Culex pipiens, Culex tarsalis, Aedes dorsalis* and *Aedes vexans*. From all these different breeding areas a total of only 20 larvae were collected, so it can be seen that they were not common anywhere.

This mosquito is a savage biter when encountered and therefore a pest of moderate importance.

Aedes vexans Meigen

This species was the fourth commonest mosquito at Fitzsimons. Larvae were found in almost every type of locale wherein mosquitoes in this area breed. However, temporarily rain-filled pools in partial shade seem to show the largest numbers. This species was found in animal hoof prints filled with rain water, in alkaline, grassy pools, in the permanent irriga-

tion ponds and marshes north of the post and in the irrigation ditch catch-basins. Larvae were found as early as May 4th and as late as August 13th. It was found associated with *Aedes dorsalis, Aedes trivittatus, Aedes nigromaculis, Culex tarsalis, Culiseta inornata, Culiseta incidens* and *Psorophora signipennis.*

Aedes vexans is one of the most important and numerous pests found on and in the vicinity of the post. It is common and a vicious biter, especially on overcast days and in the late afternoons. It was found in small numbers inside buildings, but, for the most part, seems to be an out-of-doors biter.

Culex apicalis Adams

The three specimens of *Culex apicalis* collected in this area were taken resting under Tollgate Creek bridge May 17th, 1945. Larvae have not been collected to date so nothing is known of its breeding habits.

This rare species cannot be considered a pest as it has not been known to feed on warm-blooded animals.

Culex pipiens Linnaeus

It is interesting to note that although *Culex pipiens* is to be found at Fitzsimons only during the last three months of the survey season: August, September and October, it is, nevertheless, the third commonest mosquito in numbers collected (2,-929), in the trap and by hand, including larvae and adults. Moreover, during these three months, *Culex pipiens* by far outnumbers all other species breeding and taken and is to be found in large numbers in most collections. In this area it appears to be a relatively choosy breeder and uses the more permanent types of breeding place but is occasionally found also, in small numbers, in receptacles such as waste disposal cans. *Culex pipiens* was never found in the alkaline, prairie, rain-water-filled pools that bred such large numbers of *Aedes* and even some *Culex tarsalis.* Most commonly its larvae were taken in the natural creek bordering the post; in the grasses and water plants all up and down this stream they were quite numerous, even in the presence of large schools of mosquito fish that are found in this creek. Larvae were also found in the catch-basins of our post irrigation system and, as mentioned

above, in waste disposal cans that had several inches of rain water in the bottom. This species was found breeding mostly in pure culture; however, along the creek a few *Culex tarsalis, Culex salinarius* and *Culiseta inornata* were also present.

Culex pipiens is the third most numerous species of mosquito in this area and is found commonly within buildings and wards where it bites rather viciously in the evening and night. It seems remarkable that this mosquito, though numerous, has not been previously recorded as occurring in this state.*

Culex restuans Theobald

Only ten specimens of *Culex restuans* were taken in this area and all of them were taken in the light trap during 1944, between the middle of August and the first of September. Nothing further was learned of this species' breeding habits and occurrence in this area.

This species, due to its rarity, is unimportant as a pest. However, these records are the first published of its occurrence in Colorado.

Culex salinarius Coquillett

Culex salinarius is one of the rare species of mosquitoes found in this area. Only four specimens, two adults and two larvae, were collected during the two seasons. The two adults were taken by trap in the middle of September in 1945. The two larvae, collected during the 1944 season, were also taken in the middle of September at the side of Tollgate Creek in the grasses and water plants together with larvae of *Culex tarsalis* and *Culiseta inornata.*

* A mosquito was recorded as *Culex pipiens* in 1907 by Tucker (Kansas Univ. Sci. Bull. 4: 87) as follows "*Culex pipiens* Linne. . . .Colorado, Denver; August (Determined by Dr. H. G. Dyar)."

Dr. T. D. A. Cockerell in 1918 (Jour. Econ. Ent. 11: 198) says "*Culex pipiens* Linne. Recorded from Denver by Tucker in 1907, but record needs confirmation. It was supposed to have been determined by Dyar, but Mr. Knab states that the determination must have been made by Coquillett."

Dr. Harrison Dyar in 1924 (Insect. Insc. Mens. 12: 39) says "*Culex pipiens* Linne. Recorded from Denver by Tucker in 1907. . . . The identification was wrong. . . . The specimen still exists in the National Museum collection, being a male of *Aedes trivittatus* Coq."

Culex tarsalis Coquillett

This is the commonest species of mosquito in the area. More than half of the total of 29,391 mosquitoes and larvae that were collected in this study, that is 15,670, were *Culex tarsalis*. They were found as early as May 15th and were still about, in small numbers, up until the 31st of October, even after the hard frosts of this month. This mosquito was found resting throughout the daytime—under bridges, in tree cavities, in houses, sheds and, in fact, almost anywhere it was not excluded by screening. Breeding starts the end of May and continues until the first freeze of fall. As to breeding locales, this mosquito is not as choosy as *Culex pipiens* and breeds almost anywhere: in rain water ponds, both alkaline and fresh, in a neglected, ornamental fish pond, in the grasses along Tollgate Creek, in hoof-prints at the side of this creek, in the large irrigation reservoirs north of the post, in irrigation ditches and catch-basins and even in flooded, grassy areas in the duck refuge.

This mosquito is an important pest in this vicinity and a vicious biter. It is one of the most common varieties found within houses and ward buildings.

Culiseta incidens Thomson

Culiseta incidens was collected in small numbers throughout both seasons here. A total of 100 specimens was collected; 9 were taken by trap, 36 by hand, and 55 as larvae. The hand-collected adults were found mostly in the vicinity of the game refuge resting under the duck nesting-boxes; several were found resting under the Tollgate Creek bridge. This mosquito was not observed biting man, although repeated efforts were made to induce feeding in captivity. One female was induced to feed on a guinea pig. Larvae were collected in moderate numbers in an artificial fish pond on the post area. These larvae were collected the first and end of July and the first, middle and end of September in 1944. They were associated with the larvae *Culiseta inornata, Culex tarsalis, Aedes dorsalis* and *Culiseta melanura*. During 1945 this species was collected in this same fish pond July 3rd, after which time this area was

filled in, making further breeding observations impossible. The only other area in which this mosquito was found to breed was in the catch-basins of the post irrigation system. One egg case, which later proved to be of this species, was collected here and four larvae were reared from it.

It is believed that, for the most part, this mosquito does not bite man.

Culiseta inornata Williston

This is the fifth commonest species of mosquito locally; 1,351 specimens of larvae and adults were collected during the two seasons. It was found commonly in the trap collections as well as resting collections from the first of May to the end of October. One female was collected while biting the author. This was the only observation made of this mosquito biting man, although gorged females were collected within ward buildings. Larvae were collected in almost all breeding locales. They were found in rain-water-filled hoof-prints, in the irrigation system and catch-basins on and off the post, in the ornamental fish pond on the post, in the grasses at the sides of Tollgate Creek, in the alkaline rain-water prairie ponds, in the large permanent irrigation ponds north of the post, in shady rain-water pools and, lastly, in a bedpan, partially filled with rain-water, on the post dump. This species, due to its widespread choice of breeding locales, was found breeding in association with all other species of this area.

In certain portions of its range *Culiseta inornata* does commonly attack man. As little was learned of the feeding habits of this species in our area, we cannot state of what importance its large occurrence in this area may be.

Culiseta melanura Coquillett

This species was collected only in 1944. Seven adults were taken in the trap between the end of June and the middle of August. One larva was collected June 16, 1944, in a hoof-print filled with rain water, in association with *Culiseta inornata* and *Culex tarsalis* larvae. The other *Culiseta melanura* larva was collected July 28, 1944, in the artificial fish pond on the post area, along with *Culiseta incidens*.

Culiseta morsitans Theobald

A single male of this species was identified from our 1945 collections. It was collected by hand in the vicinity of the game preserve. During the 1944 season several specimens, collected by hand in the same vicinity, were listed as of this species and were so published. These, I am now convinced, are really *C. incidens.*

Psorophora signipennis Coquillett

This species is fairly rare in our area, a total of 16 specimens being collected during the two seasons. Twelve were collected by trap, one by hand and three in collections of larvae. The few specimens taken in the trap were collected between the middle of July and the end of August. July 26, 1945, one adult was collected among freshly emerged *Aedes nigromaculis* and *Aedes dorsalis* by sweeping the net over the short grass bordering the alkaline, rain-water-filled hoof-prints and depressions of the big *Aedes dorsalis* breeding area. No *Psorophora* larvae were ever collected in this area, however. The three larvae collected were taken in the irrigation-ditch catch-basins west of the post golf course among larvae of *Culiseta inornata, Culex tarsalis, Aedes vexans* and *Aedes trivittatus.* One larva was collected at this site June 7, 1945, and the other July 26, 1945, indicating that two broods may take place.

Summary

1. During a two-season survey (1944–1945) 29,391 mosquitoes, both adults and larvae, were collected and identified.

2. Eighteen species of mosquitoes were found to occur on and in the vicinity of the post. Notes on their occurrence, breeding and biting habits are recorded.

3. Out of 29,391 larvae and mosquitoes identified not a single specimen of *Anopheles* was found.

4. Four new state records were made for Colorado as follows: *Aedes sticticus* Meigen, *Aedes triseriatus* Say, *Culex pipiens* Linnaeus, *Culex restuans* Theobald.

Notes on District of Columbia Wasps (Hym.: Sphecoidea)

By David G. Shappirio

Motes argentatus Pal. de Beauv.

The collecting season for wasps in the D. C. region extends usually into late October, but for *Motes argentatus,* a locally common species, there was no halt to the appearance of females from the Fall of 1944 to the Spring of 1945. It was possible during these months to go out at nearly any time of day during almost any kind of weather, and obtain one or two females. Rain alone kept them away, as even when snow was on the ground specimens could be seen flying around as if it were July or August.

The area in which they were obtained is ordinarily a good collecting-ground, being an open clay bank with pines to one side and second-growth plants on the other. Specimens were taken from Nov., 1944 to March, 1945 as follows: Nov. 26, 2 ♀♀; Dec. 19, 1 ♀; Jan. 28, 1 ♀ in snow; Feb. 11, 3 ♀♀; Feb. 25, 3 ♀♀; Mar. 10, 1 ♀ in light snow.

Thus, these insects, which one would normally associate with hot weather, were nevertheless found quite consistently throughout the winter. May this not necessitate a revision of our views on the seasonal appearance of wasps, at least of this species?

Bembecinus nanus Hdl.

Bembecinus nanus, ordinarily scarce in any locality, has been extremely common in the Washington area and in some localities more plentiful than nearly every other wasp.

On a cloudy, very hot and oppressive day in mid-July, wasps of all types were out in great numbers. They seemed to fly slowly, and lacked their usual energetic manner, as if the heat and humidity were almost too much for them. A *Bembecinus* female was seen flying along, carrying what appeared to be a leaf-hopper. She sensed intrusion as she was approached, dropped the prey, which was unfortunately lost, and left the

vicinity. This occurrence was repeated several times and it was seen that another way of obtaining a specimen of the prey would have to be found.

After a wait of thirty minutes beside a *Bembecinus* burrow, the owner returned, carrying her prey. She was picked up by hand, since it was worth being stung to get her prey. The latter was found to be a leaf-hopper, *Graphocephala versuta* Say.* On another occasion, this species has been taken with fulgorid bugs as the prey but this record is unobtainable. *B. nanus,* it was found, returns to the burrow daily with fresh food for the larva, resembling in this habit many other of the bembecine wasps.

To my knowledge, this species was never recorded from this area until July, 1945, when it became very common, and continued so until Autumn. It has been common again in 1946, although not quite in the numbers of 1945.

Current Entomological Literature

COMPILED BY CHARLES HODGE IV, RAYMOND Q. BLISS, EDWIN T. MOUL, MAURICE E. PHILLIPS AND HENRY K. TOWNES JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of Journals given at the end of the literature. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Munro, J. W.—Entomology of stored products. [31] 24: 649–658. **Vappula, N. A.**—Finnish entomological literature published in 1942 including economic entomology and control of insect pests. [32] 9: 1–12.

* Kindly determined by Dr. P. W. Oman.

ANATOMY, PHYSIOLOGY, MEDICAL—Boyce, J. M.—Influence of fecundity and egg mortality on the population growth of Tribolium confusum Duval. [11] 27: 290–302. **Cooper, K. W.**—Detachment frequency of attached x-chromosomes in autosomal structural heterozygotes of Drosophila melanogaster. [26] 32: 273–275. **Cristol, Haller, Lindquist**—Toxicity of DDT Isomers to some insects affecting man. [30] 104: 343–344. **Ellenby, C.**—A microrespirometer for single prepupae of Drosophila melanogaster Meigen. [16] 22: 85–87, ill. **Fraenkel and Blewett**—The dietetics of the caterpillars of three species of Ephestia, E. kuehniella, E. elutella and E. cantella and of a closely related species Plodia interpunctella. [16] 22: 162–171, ill. **Fraenkel and Blewett**—The dietetics of the clothes moth, Tineola bisselliella Hum. [16] 22: 156–161, ill. **Fraenkel and Blewett**—Linoleic acid, vitamin E and other fat-soluble substances in the nutrition of certain insects (Ephestia kuehniella, E. elutella, E. cantella and Plodia interpunctella.) [16] 22: 172–190, ill. **Glaser, R. W.**—Intracellular bacteria of the cockroach in relation to symbiosis. [20] 32: 483–489. **Hershberger, R. V.**—Differential stains of insect tissues. [22] 46: 152–162. **Kangas and Leskinen**—Pegohylemyia anthracina Czerny (Muscidae) als Zapfenschadling an der Fichte. [32] 9: 195–212, ill. **Khatib, S. M. H.**—Studies in Galerucinae. The internal anatomy of Galerucella birmanica (Jacoby). [25] 24B: 35–54, ill. **Possompes, B.**—Les glandes endocrines post-cérébrales des dipteres. I. Etude chez la larve de Chironomus plumosus L. [7] 72: 99–109, ill. **Stanley, J.**—The environmental index, a new parameter as applied to Tribolium. [11] 27: 303–314. **Sze, Li-chieh**—Cytological studies on Acrididae. IV. Structure of the x-chromosome in the meiosis of Phlaeoba infromata. [19] 79: 113–123, ill.

ARACHNIDA AND MYRIOPODA—Brennan, J. M.—Two new species of Trombicula: T. montanensis and T. aplodontiae (Acarina, Trombiculidae) from N.W. United States. [20] 32: 441–444, ill. **Cooper, K. W.**—Occurrence of the mite Cheyletiella parasitivorax (Megnin) in N. America, with notes on its synonymy and "parasitic" habit. [20] 32: 480–482. **Ewing, H. E.**—Notes on Trombiculid mites with descriptions of Walchiinae n. subf., Speotrombicula n. g., and Eutrombicula defecta n. sp. [20] 32: 435–440 (k), ill. **Fox, I.**—New genus, Boringuolaelaps, and new species of mites from rats in Puerto Rico. [20] 32: 445–452 (k),

ill. **Turk, F. A.**—Studies of Acari V—Notes on and descriptions of new and little-known British Acari. [3] 12: 785–820 (k*), ill. **Wharton, G. W.**—Observations on Ascoschongastia indica (Hirst, 1915) (Acarinida: Thorbiculidae). [10] 16: 153–184, ill.

SMALLER ORDERS—Bonet, F.—Nuevos generos y especies de Hipogastruridos de Mexico (Collembola). [29] 6: 13–45 (k), ill. **Calvert, P. P.**—New species of Brazilian Libellulinae (Odonata) and their nearest allies. [6] 69: 1–4, ill. **Dampf, A.**—Notas sobre pulgas. I a VII. [29] 6: 47–69, ill. **Geijskes, D. C.**—Observations on the Odonata of Tobago, B.W.I. [34] 97: 213–235 (k), ill. **Guimaraes, L. R.**—Alguns aspectos bionomicos de Leptopsylla segnis (Schonh.) (Suctoria). [4] IV: 233–259. **Hickin, N. E.**—Larvae of the British Trichoptera 21. [34] 21: 61–65, ill. Larvae of British Trichoptera 22. [27] 21: 55–60, ill. **Hollenbeck, A. H.**—A practical method for mass production and transfer of Xenopsylla cheopis. [20] 32: 463–464, ill. **Longfield, C.**—Larvae of the Sympetrum fonscolombii (Selys) (Odonata). [27] 21: 47–48, ill. **Rehn, J. A. G.**—Five new species of earwigs of the Indo-Pacific genus Nesogaster (Dermaptera: Labiidae: Nesogastrinae). [23] 98: 219–239. **Saunders, L. G.**—A Canadian Japygid (Thysanura). [8] 78: 95. **Tjeder, B.**—Neuroptera and Mecoptera of N. Norway. [35] 63: 3–15, 1943.

ORTHOPTERA—Burtt, E.—Observations on east African Pamphaginae (Orthoptera) with particular reference to stridulation. [27] 21: 51–54, ill. **Filho, L. T.**—Tecnicas gerais seguidas no estudo da ordem mantodea Burmeister, 1838. [4] IV, 113–155; sobre a familia Acanthopidae Burmeister, 1838. [4] IV, 157–231, ill. **Glaser, R. W.**—(See Anatomy, etc.) **Sze, Li-chieh**—(See under Anatomy, etc.)

HEMIPTERA—Broadbent, L.—Alate aphides trapped in Northwestern Derbyshire, 1945. [27] 21: 41–46. **Carvalho, J. C. M.**—Mirideos neotropicais XXV, Genero Pachymerocerus Reuter e correcoes de trabalhos anteriores (Hemiptera). [6] 68: 1–9, ill. **Cleaves, H. H.**—The magic cicada on Staten Island, 1945. [28] 10: 73–80. **Dean and Chapman**—Biology and control of the Apple Redbug. [21] Bull. 716: 3–42, ill. **Emery, W. T.**—Temporary immunity in alfalfa ordinarily susceptible to attack by the pea aphid. [15] 73: 33–43. **Hartzell, F. Z.**—Methods of estimating foliage area injured by grape leaf-hoppers. [21] Tech. Bull. 277: 5–49, ill. **Jacob, F. H.**—New British species of My-

zaphis van der Goot associated with wild roses, Myzaphis bucktoni sp. n.; and a comparison with M. rosarum (Kaltenbach) (Hem: Aphididae). [27] 15: 110–117, ill. **Koestner, J.**—Museum notes on the 17-year Cicada. [28] 10: 81–84. **Lambers and Rogerson**—New British Aphid from Prunus padus L., Myzus padellus sp. n. (Hem: Aphididae). [27] 15: 101–105, ill. **Metcalf, Z. P.**—Gen. Cat. of the Hemiptera. Fas. IV. Fulgoroidea. Part 8, Dictyopharidae. Smith College, Mass. **Pallister, J. C.**—Type material and specimens taken from the Davis collection of Cicadas, Staten Island Museum. [28] 10: 45–47; Cicadas described by Wm. T. Davis which should be in the Davis collection or place of deposit uncertain. [28] 10: 48– . **Usinger, R. L.**—Gen. Cat. of Hemiptera. Fas. V. Polycteridae. Smith College. **Usinger, R. L.**—Notes and descriptions of Ambrysus Stal with an account of the life history of Ambrysus mormon Montd. (Hemiptera: Naucoridae). [37] 31: 185–210 (*), ill. **Zakhvatkin, A. A.**—Studies on the Homoptera of Turkey. [34] 97: 149–176 (*), ill.

LEPIDOPTERA—Beall, G.—Seasonal variation in sex proportion and wing length in the migrant butterfly, Danaus plexippus (Danaidae). [34] 97: 337–353, fig. **Carpenter, G. D. H.**—Capture of butterflies in great numbers by the grass Setaria verticillata (L) Beauv. in east Africa. [27] 21: 49–50. **Clark, A. H.**—Two new butterflies from the Admiralty Islands. [24] 59: 119–120. **D'Almeida, R. F.**—Estudos biologicos sobre alguns Lepidopteros do Brasil. [4] IV: 32–70, ill.; Segunda nota suplementar a "Revisao das Terius americanas." [4] IV: 73–94, ill.; Revisao do genero Xanthocleis Boisd. [4] IV: 97–112, ill. **Francle-mont, J. G.**—Revision of the species of Symmerista Hübner known to occur N. of the Mexican border (Lepidoptera: Notodontidae). [8] 78: 96–103 (k*), ill. **Fraenkel and Blewett**—(See under Anatomy, etc.) **Gardner, J. C. M.**—On larvae of the Noctuidae. II. [34] 97: 237–252 (k), ill. **McDunnough, J.**—Notes on Robinia-feeding Phycitid larvae (Lep.: Phycitinae). [8] 78: 109–110. **McDunnough, J.**—Gracillariid studies (Lepidoptera). [8] 78: 91–95 (*), ill. **Musgrave, A.**—Some butterflies of Australia and the Pacific. Swallowtails. [5] 9: 66–72, ill. **Richards, O. W.**—Rearing larva of the eyed hawk-moth, Smerinthus ocellatus (L), on apple and sallow. [27] 21: 72. **Richards, O. W. and Wal-off, N.**—Study of a population of Ephestia elutella Hübner (Lep., Phycitidae) living on bulk grain. [34] 97: 253–298,

ill. **Waloff and Richards**—Observations on the behaviour of Ephestia elutella Hübner (Phycitidae) breeding on bulk grain. [34] 97: 299–335, fig. **Wiltshire, E. P.**—Middle east Lepidoptera V. New genus, new species, and 2 new races from Iran, with taxonomic notes on other Persian Heterocera. [27] 15: 118–128, ill.

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